Strand 1: Number and Operations

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Concept 1: Number Sense

Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
PO 1. Express numbers to 20 using and connecting multiple representations, including: • objects, • pictures, • spoken words, and • numerals. (connects to M00-S2C3-01, M00-S2C3-02, M00-S2C4-02, M00-S2C1-02, M00-S4C4-02, M00S1C3-01)	PO 1. Express whole numbers to 100, in groups of tens and ones using and connecting multiple representations, including: • models, • pictures, • spoken and written words, • numerals, and • expanded notation. (connects to MO1-S1C1-02, M01-S2C2-02, M01-S2C3-01, M01-A2C3-02)	PO 1. Express numbers to 1,000, in groups of hundreds, tens, and ones using and connecting multiple representations, including: • base 10 models, • pictures, • spoken and written words, • numbers, and • expanded notation. (connects to M02-S1C1-02, M02-S2C1-01, M02-S2C1-02, M02-S2C3-01, M02-S2C3-02, M02-S4C4-01)	PO 1. Express whole numbers through 6 digits using models, pictures, symbols, spoken and written words, and/or expanded notation.	PO 1. Connect model, number word, and/or number using various models and representations for whole numbers, fractions, and percents.	PO 1. Determine equivalency by converting between and among fractions, decimals, and percents when numerator and denominator are simple multiples.	PO 1. Translate between rational numbers including fractions, decimals, percents, or ratios; apply representations of rational numbers including fractions, decimals, percents, or ratios.

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Concept 1: Number Sense Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 2. Apply counting to 20 using different starting points: • counting aloud forward to 20, • counting aloud backward from 10 (with or without objects), and • using one-to-one correspondence. (connects to M00-S2C3-01, M00-S2C3-02, M00-S2C4-02, M00-S2C1-02, M00-S4C4-02)	PO 2. Apply counting to 100 using different starting points by: • counting forward or backward, • counting by 5's and 10's, and • finding the missing numbers on a number line. (connects to M01-S1C1-01, M01-S2C1-02, M01-S2C3-01, M01-S2C3-02)	PO 2. Apply counting to 1,000 using different starting points: • counting aloud forward or backward and • finding missing numbers on a number line. (connects to M02-S1C1-01, M02-S2C1-01, M02-S2C1-02, M02-S4C4-01)				
PO 3. Identify one more/one less than a given number up to 20.	PO 3. Identify 10 more/10 less than a given number up to 90.	PO 3. Identify 100 more/100 less than a given number up to 900.				

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Concept 1: Number Sense Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 4. Compare two numbers and order three or more whole numbers through 10 using objects, pictures, numerals, and comparative language (more, less, same, equal, greater, bigger, smaller, etc.).	PO 4. Compare two whole numbers and order three or more whole numbers through 100 by applying the concept of place value and using comparative language and symbols (=, ≠).	PO 4. Compare two whole numbers and order three or more whole numbers through 1,000 by applying the concept of place value using symbols (<, >, =, ≠). (connects to M02-S3C3-02)	PO 2. Compare and order three or more whole numbers through 6 digits by applying the concept of place value using symbols (<, >, =, ≠).			
	PO 5. Identify the place value and actual value of digits for whole numbers up to 2 digits.	PO 5. Identify the place value and actual value of digits for whole numbers up to 4 digits (to 1,000).	PO 3. Identify the place value and actual value of digits for whole numbers up to six digits.	PO 2. Identify the place value and actual value of digits for whole numbers and decimals to hundredths.		

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Concept 1: Number Sense Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
		PO 6. Explain why a whole number through 1,000 is odd or even.	PO 4. Sort numbers into sets and justify the sort.	PO 3. Compose and decompose numbers using factors and multiples.	PO 2. Relate: • prime and composite numbers and • factors and multiples for whole numbers and fractions.	PO 2. Use prime factorization to: • determine the greatest common factor and least common multiples of two whole numbers, and • express a whole number as a product of its prime factors (including exponents when appropriate).
PO 5. Recognize and compare the ordinal position of at least five objects.	PO 6. Recognize and compare ordinal numbers, first through tenth.					
		PO 7. Count money to $1.00: • find the value of a collection of coins and • use multiple ways to represent a given amount. (connects to M02-S1C2-01)	PO 5. Count and represent money using coins and bills up to $20.00. (connects to M03-S1C2-01)			

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Strand 1: Number and Operations

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Concept 1: Number Sense Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
		PO 8. Identify and represent common fractions (halves, thirds, fourths) as: • fair sharing parts of wholes, • parts of a set, and • locations on a number line.	PO 6. Describe benchmark fractions as: • fair sharing parts of whole, • parts of a set, and • as locations on a number line.	PO 4. Express fractions as: • fair sharing parts of wholes, • parts of a set, and • locations on a number line.		PO 3. Demonstrate an understanding of fractions: • as a rate or as division of whole numbers, • as parts of wholes or parts of a set, or • as locations on a number line.
			PO 7. Express benchmark fractions using models, symbols, and written and spoken words in and out of context.	PO 5. Use simple ratios to describe problem situations in context.		
			PO 8. Compare and order ($<, >, =, \neq$) benchmark fractions with like denominators.	PO 6. Compare and order ($<, >, =, \geq, \leq$) decimals or fractions in contextual or non-contextual situations.	PO 3. Compare and order between and among three or more fractions, decimals, percents, or ratios in contextual or non-contextual situations.	PO 4. Compare and order positive fractions, decimals, percents, and negative and positive integers.
						PO 5. Express or interpret positive and negative numbers from real-life contexts.

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Concept 1: Number Sense Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
						PO 6. Express the inverse relationships between exponents and roots for perfect squares and cubes.

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Concept 2: Numerical Operations Understand and apply numerical operations and their relationship to one another.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 1. Solve contextual problems by developing, applying, and recording strategies with sums and minuends through 10 using objects, pictures, and symbols. (connects to M00-S5C2-01, M00-S5C2-02)	PO 1. Solve contextual problems using multiple representations for addition and subtraction facts. (connects to M01-S5C2-03)	PO 1. Solve contextual problems using multiple representations involving: • addition and subtraction up to 2-digit numbers, • multiplication for 1s, 2s, 5s, and 10s, and • adding and subtracting money up to $1.00. (connects to M02-S1C1-07, M02-S1C2-02, M02-S1C2-03, M02-S1C2-04, M02-S2C1-01, M02-S2C1-02, M02-S2C3-01, M02-S3C2-01, M02-S5C2-03)				

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Concept 2: Numerical Operations Understand and apply numerical operations and their relationship to one another.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 2. Develop and use multiple strategies to determine: • sums through at least 10 and • differences with minuends up to 10.	PO 2. Determine the sum and difference of numbers less than 100 by developing and using multiple strategies.	PO 2. Demonstrate the ability to add and subtract whole numbers (up to at least two digits) and decimals (in the context of money) flexibly, accurately, and efficiently: • with models and manipulatives, • with up to three addends, and • up to $1.00. (connects to M02-S3C2-01, M02-S3C3-04)	PO 1. Add and subtract whole numbers to at least four digits, money to $20.00, and fractions with like denominators accurately, efficiently, and flexibly in contextual and non-contextual situations. (connects to M03-S1C1-05, M03-S1C1-06, M03-S1C2-02, M03-S3C3-03)	PO 1. Add and subtract decimals through hundredths and fractions with like denominators accurately, efficiently, and flexibly in contextual and non-contextual situations.	PO 1. Add and subtract whole numbers to any place value, fractions and decimals through thousandths accurately, efficiently, and flexibly in contextual and non-contextual situations.	PO 1. Add, subtract, multiply, and divide fractions, decimals, and whole numbers accurately, efficiently, and flexibly in contextual and non-contextual situations.
	PO 3. Develop and use multiple strategies for addition and subtraction facts.	PO 3. Solve problems by recalling and using addition and subtraction facts. (connects to M02-S3C2-01, M02-S3C3-04)				

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Concept 2: Numerical Operations Understand and apply numerical operations and their relationship to one another.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
		PO 4. Demonstrate the concept of multiplication for 1s, 2s, 5s, and 10s: • using skip counting, • combining equal sets, • making arrays, and • using repeated addition.	PO 2. Demonstrate the process of multiplication and division using multiple models.	PO 2. Use multiple strategies to multiply whole numbers accurately, efficiently, and flexibly in contextual and non-contextual situations: • two-digit by two-digit and • multi-digit by one-digit.	PO 2. Multiply multi-digit whole numbers and decimals through thousandths accurately, efficiently, and flexibly in contextual and non-contextual situations.	
			PO 3. Use multiple strategies to develop fluency with multiplication and division through 10s in contextual and non-contextual situations. (connects to M03-S2C3-01, M03-S3C3-03)	PO 3. Use multiple strategies to divide whole numbers accurately, efficiently, and flexibly in contextual and non-contextual situations: • three-digit by one-digit.	PO 3. Divide multi-digit whole numbers and decimals with dividends through thousandths and by whole number divisors accurately, efficiently, and flexibly with and without remainders in contextual and non-contextual situations.	PO 2. Divide multi-digit whole numbers and decimals by decimals divisors accurately, efficiently, and flexibly with and without remainders in contextual and non-contextual situations.
					PO 4. Multiply and divide benchmark fractions using models.	

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Concept 2: Numerical Operations Understand and apply numerical operations and their relationship to one another.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
						PO 3. Provide a mathematical argument to explain operations with two or more fractions.
	PO 4. Solve addition/subtraction problems by applying properties: • identity property of addition/ subtraction and • commutative property of addition.	PO 5. Apply properties to solve addition/subtraction problems: • identity property of addition/ subtraction, • commutative property of addition, and • associative property of addition.	PO 4. Apply commutative and identity properties to multiplication and division.	PO 4. Apply associative and distributive properties to solve multiplication and division problems in contextual and non-contextual situations.	PO 5. Apply the properties of equivalence to solve numerical problems.	PO 4. Apply the commutative, associative, distributive, and identity properties to evaluate numerical expressions involving natural numbers and whole numbers.
		PO 6. Apply the concept of addition and subtraction as inverse operations to solve problems (fact families).	PO 5. Apply the concept of multiplication and division as inverse operations to solve problems. (fact families)	PO 5. Use multiple strategies to develop fluency of multiplication and division fact families through 12s.		

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Concept 2: Numerical Operations Understand and apply numerical operations and their relationship to one another.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
				PO 6. Apply order of operations with whole numbers.	PO 6. Simplify numerical expressions using the order of operations on number sets including fractions and decimals and with or without grouping symbols.	PO 5. Simplify numerical expressions (involving fractions, decimals, and exponents) using the order of operations with or without grouping symbols.

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Concept 3: Estimation Use estimation strategies reasonably and fluently integrating content from each of the other strands.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 1. Estimate quantities up to 20 using 5 and 10 as benchmarks. (connects to M00-S1C1-01, M00-S1C1-02)	PO 1. Estimate quantities, sums, or differences to 100 using multiples of 5, 10, and 25 as benchmarks.	PO 1. Use benchmark numbers and/or number lines to estimate, calculate, and solve problems involving addition and subtraction of numbers up to two digits.	PO 1. Use zero, half, and whole as benchmarks for estimating fractions.	PO 1. Use the benchmarks (zero, quarter, half, and whole) as meaningful points of comparison for whole numbers, decimals, and fractions in and out of context.	PO 1. Use benchmarks including powers of 10 and common fractions with odd denominators, as meaningful points of comparison to solve problems in and out of context.	PO 1. Use benchmarks as meaningful points of comparison for integers and negative fractions in and out of context.

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Concept 3: Estimation Use estimation strategies reasonably and fluently integrating content from each of the other strands.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
			PO 2. Make estimates appropriately to a given situation with whole numbers by: • knowing when to estimate, • selecting an appropriate method of estimation, and • determining the reasonableness of an estimate.	PO 2. Make an estimate for quantities and the results of computations with whole numbers and fractions by: • knowing when to estimate, • selecting the appropriate type of estimation, • selecting and using a variety of estimation strategies, and • verifying solutions or determining the reasonableness of results in meaningful contexts.	PO 2. Estimate the results of computations with whole numbers, fractions, and decimals; verify solutions or determine the reasonableness of results in meaningful contexts.	PO 2. Make estimates appropriate to a given situation by • identifying when estimation is appropriate, • determining the level of accuracy needed, • selecting the appropriate method of estimation, and • verifying solutions or determining the reasonableness of situations using various estimation strategies.
		PO 2. Describe differences between estimates and actual calculations.				

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Strand 2: Data Analysis, Probability, and Discrete Mathematics

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Concept 1: Data Analysis (Statistics)

Understand and apply data collection, organization, and representation to analyze and sort data.

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
PO 1. Construct simple displays of data using objects and/or pictures. (connects to SC00-S1C4-01, M00-S2C1-02)	PO 1. Collect, record, organize, and display data based on questions using tally charts and pictographs. (connects to SS01-S4C1-04, SC01-S1C2-04, SC01-S1C4-01, M01-S2C1-02, M01-S1C1-01, M01-S1C1-02)	PO 1. Collect, record, organize, and display data using pictographs with symbols that represent multiple units, frequency tables, and single bar graphs. (connects to M02-S1C1-01, M02-S1C1-02, SS02-S4C1-04, SC02-S1C2-04)	PO 1. Collect, generate, organize, and display data in contextual situations using: • horizontal and vertical single bar graphs, • line plots, and • frequency tables. (connects to SS03-S4C1-05, SC03-S1C2-05, SC3-S1C3-01)	PO 1. Collect, generate, organize, and display data: • double bar graph, • single line graph, and • circle graph. (connects to SC04-S1-C2-05, SC04-S1C4-02, SS04-S4C1-04)	PO 1. Collect, generate, organize, and display data: • multi bar graphs and • double line graphs. (connects to M05-S2C1-02, SC05-S1C1-01, SC05-S1C1-05, SC05-S1C4-02, SS05-S1-01, SS05-S2-01, SS05-S4-06)	PO 1. Solve contextual problems by constructing and utilizing a histogram or stem-and-leaf plot with appropriate labels, title, and intervals from collected data. (connects to SC06-S1C4-01)
PO 2. Interpret data by counting, comparing, and answering questions on simple displays of data. (connects to M00-S1C1-01, M00-S1C1-02, M00-S1C1-04, M00-S1C1-05, M00-S1C2-01, M00-S1C2-02)	PO 2. Interpret data and answer questions based on simple displays of data. (connects to M01-S2C1-01)	PO 2. Interpret displays of data; formulate questions based on displays of data. (connects to M02-S2C1-01, M02-S1C1-01, M02-S1C1-02, M02-S1C2-01, M02-S1C2-02, M02-S1C2-03, M02-S1C2-04, SC02-S1C3-01)	PO 2. Analyze displays of data; formulate questions based on displays of data. (connects to M03-S2C1-01, SC03-S1C3-02)	PO 2. Analyze and formulate questions from displays of data and solve problems by estimating and computing within a set of data. (connects to M04-S2C1-01, M04-S1C3-02, R04-S1C6-03, SC04-S1C1-02, SC04-S1C1-03)	PO 2. Draw inferences and formulate questions from displays of data. (connects to M05-S2C1-01, SC05-S1C1-02, SC05-S1C3-01)	PO 2. Read, interpret, and answer questions from displays of data. (connects to M06-S2C1-01, SC06-S1C3-04, SS06-S2-02)

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Strand 2: Data Analysis, Probability, and Discrete Mathematics

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Concept 1: Data Analysis (Statistics) Understand and apply data collection, organization, and representation to analyze and sort data.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
				PO 3. Use median to describe the distribution of the data, given a set of data or a graph.	PO 3. Use median and mean to analyze and describe the distribution of the data in contextual situations, given a set of data or a graph.	PO 3. Solve contextual problems by applying the following measures for a data set (extreme values, mean, median, mode, range, and frequency); state how the measures describe the data.
				PO 4. Compare two sets of related data. (connects to SC04-S1C4-03)		PO 4. Compare data by identifying trends (increasing, decreasing, remaining constant). (connects to SC06-S1C1-01)

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Strand 2: Data Analysis, Probability, and Discrete Mathematics

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Concept 2: Probability Understand and apply the basic concepts of probability.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
			PO 1. Describe elements of theoretical probability: • name or draw all possible outcomes and • predict the outcome using "likely," "unlikely," "certain," or "impossible."	PO 1. Describe elements of theoretical probability: • list or draw all possible representations of a given situation or event, • predict the outcome using "more likely," "less likely," "equally likely," or "unlikely," and • determine a simple probability from a context that includes a picture.	PO 1. Describe the theoretical probability of events and represent using a fraction, decimal, or percent.	

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Concept 2: Probability Understand and apply the basic concepts of probability.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
			PO 2. Demonstrate elements of experimental probability: • predict specific outcomes based on manipulatives used with the experiment, • perform experiment, • record data, • compare the outcome to the prediction, and • compare the results of multiple repetitions.	PO 2. Demonstrate elements of experimental probability: • predict outcomes using charts and tree diagrams, • perform experiments, • record data from a given situation or event, and • compare the outcome to the prediction. (connects to R04-S1C6-01)	PO 2. Design experiments, record data, and predict and compare outcomes of an experiment.	PO 1. Use data collected from multiple trials of a single event to form a conjecture about the theoretical probability.
						PO 2. Determine all possible outcomes (sample space) of a given situation using a systematic approach (e.g., frequency tables, tree diagrams, charts/tables, ordered pairs, matrices).

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Concept 2: Probability Understand and apply the basic concepts of probability.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
						PO 3. Use theoretical probability to predict experimental outcomes: compare the outcome of the experiment to the prediction and replicate the experiment and compare results.
					PO 3. Compare the results of multiple repetitions of the same probability experiment.	

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Concept 3: Discrete Mathematics – Systematic Listing and Counting

Understand and demonstrate the systematic listing and counting of possible outcomes.

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
PO 1. Sort, classify, count, and represent small numbers of objects and justify the sorting rule. (connects to M00-SS1C1-01, M00-S1C1-02, SC00-S1C3-01, SC00-S5C3-03, SC00-S6C1-03)	PO 1. Sort, classify, count, and represent objects using Venn diagrams and justify the sorting rule. (connects to M01-S1C1-01, M01-S1C1-02, SC01-S1C3-01, SC01-S5C1-01, SC01-S5C1-02)					PO 1. Explore counting problems with Venn diagrams using three attributes.
		PO 1. Solve a variety of problems based on the addition principle of counting.	PO 1. Solve a variety of problems based on the multiplication principle of counting. (connects to M03-S1C2-04)	PO 1. Explain the multiplication principle of counting.	PO 1. Solve a variety of counting problems and justify that all possibilities have been enumerated without duplication.	
PO 2. Find possibilities in simple counting situations through exploration and modeling. (connects to M00-S1C1-01, M00-S1C1-02)	PO 2. Find possibilities in simple counting situations through exploration and modeling.	PO 2. List all possibilities in simple counting situations in a systematic way using objects, pictures, and/or words. (connects to M02-S5C2-01)	PO 2. Represent all possibilities for a variety of counting problems using arrays, charts, and systematic lists; draw conclusions from these representations.	PO 2. Represent all possibilities for a variety of counting problems using a tree diagram; explain properties of the tree diagram and what they represent in the problem; create different tree diagrams to represent the same counting problem; and draw conclusions.	PO 2. Analyze relationships among representations (arrays, charts, systematic lists, tree diagrams) and make connections to the multiplication principle of counting.	PO 2. Build and explore tree diagrams where items repeat (e.g., all possible arrangements of the letters in the word TREE).

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Concept 4: Vertex-Edge Graph Understand and apply vertex-edge graphs.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 1. Color simple pictures or figures using the fewest number of colors and justify the coloring.	PO 1. Color simple pictures or figures using the fewest number of colors (regions that share a common edge should be colored differently).		PO 1. Color the regions of maps and color the vertices of a graph using the fewest number of colors, as an introduction to the general problem of avoiding conflicts.	PO 1. Construct and color graphs that represent conflicts.	PO 1. Solve conflict resolution problems using vertex coloring.	
		PO 1. Build and explore vertex-edge graphs using concrete materials.				
		PO 2. Construct simple vertex-edge graphs from simple pictures or maps.	PO 2. Draw vertex-edge graphs to represent concrete situations and identify paths and circuits.			PO 1. Use vertex-edge graphs to represent and solve problems related to shortest path/circuit including Hamilton path/circuit.

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Concept 4: Vertex-Edge Graph Understand and apply vertex-edge graphs.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 2. Identify the number of regions in a simple picture or figure. (connects to M00-S1C1-01, M00-S1C1-02)		PO 3. Explore simple properties of vertex-edge graphs: • number of vertices and edges, • neighboring vertices, and • vertex-coloring.	PO 3. Investigate simple properties of vertex-edge graphs: • weights on edges and • shortest path between two vertices.	PO 2. Investigate simple properties of graphs (degree of a vertex) to determine whether a path or circuit exists in a graph.	PO 2. Investigate properties of vertex-edge graphs: • Euler path and • Euler circuit.	
					PO 3. Analyze graph-related problems in finding the best solution to conflict resolution problems.	

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Strand 3: Patterns, Algebra, and Functions

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Concept 1: Patterns

Identify patterns and apply pattern recognition to reason mathematically integrating content from each of the other strands.

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
PO 1. Recognize, describe, extend, create, and record simple repeating patterns.	PO 1. Recognize, describe, extend, create, and record repeating patterns.	PO 1. Recognize, describe, extend, or find missing terms in a numerical or symbolic pattern.	PO 1. Recognize, analyze, extend, and create or find missing terms in sequential numerical patterns and geometric patterns.	PO 1. Create, describe, and extend numerical patterns involving whole numbers using all four basic operations.	PO 1. Evaluate sequential patterns involving whole numbers and fractions (including decimals) using all four basic operations.	PO 1. Describe, analyze, and create sequential patterns using order of operations.
PO 2. Recognize, describe, extend, and record simple growing patterns.	PO 2. Recognize, describe, extend, create, and record growing patterns.	PO 2. Create a different representation of a given numerical or symbolic pattern.				
		PO 3. Explain the rule for a given numerical or symbolic pattern.	PO 2. Explain the rule for a given numerical or symbolic pattern.	PO 2. Find the missing term and explain the rule, given a pattern or sequence.		

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Concept 2: Functions and Relationships Describe and model functions and their relationships.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
		PO 1. Describe, extend, or find missing term(s) in a given function or rule using addition or subtraction. (connects to M02-S1C2-01, M02-S1C2-02, M02-S1C2-03)	PO 1. Describe, extend, or find missing term(s) in a given function or rule with addition, subtraction, multiplication, or division.			
			PO 2. Describe a rule that represents the relationship between two given sets of data which are on a table, model, input/output machine, etc.	PO 1. Recognize, describe, and state a relationship in which quantities change proportionally using words, pictures, and expressions.	PO 1. Use expressions to represent the rule of a function.	PO 1. Generalize a pattern appearing in a chart, table, or graph using words and expressions.
				PO 2. Translate between the different representations including symbolic, numerical, verbal, or pictorial of whole number relationships.		

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Concept 3: Algebraic Representations Represent and analyze mathematical situations and structures using algebraic representations.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 1. Record equivalent forms of whole numbers to at least 10 by constructing models and using numbers. (connects to M00-S1C2-02)	PO 1. Record equivalent forms of whole numbers to 100 by constructing models and using numbers. (connects to M01-S3C3-02)	PO 1. Record equivalent forms of whole numbers to at least 1,000 by constructing models and using numbers.	PO 1. Record equivalent forms of whole numbers up to six digits by constructing models.			
PO 2. Describe relationships between quantities using spoken words and "=".(connects to M00-S1C1-02)	PO 2. Compare expressions using spoken words, "=", and "□".(connects to M01-S3C3-01)	PO 2. Compare expressions by applying the symbols (<, >, =, ≠). (connects to M02-S1C1-04)				
	PO 3. Represent a word problem requiring addition or subtraction facts in an equation using the following forms: • a + b = □, • a + □ = c, • c – a = □, and • c - □ = b. (connects to M01-S1C2-01, M01-S5C2-03)	PO 3. Represent a word problem requiring addition or subtraction through 100 into an equation using the following forms: • a + b = □, • a + □ = c, • □ + b = c, • c – a = □, • c - □ = b, and • □ – a = b.	PO 2. Use symbols to represent variables in contextual situations. (connects to M03-S1C2-03	PO 1. Use variables to represent an unknown quantity in a simple mathematical expression involving all operations.		PO 1. Use algebraic symbols to represent variables in contextual situations.

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Concept 3: Algebraic Representations Represent and analyze mathematical situations and structures using algebraic representations.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
					PO 1. Evaluate expressions by substituting whole numbers, decimals, and fractions for the variable.	PO 2. Evaluate expressions involving the four basic operations by substituting given fractions and decimals for the variable (e.g., n+3, when n= ½).
		PO 4. Identify the value of the variable in an equation involving an addition or subtraction fact. (connects to M02-S1C2-02, M02-S1C2-03)	PO 3. Create and solve equations with one variable for addition and subtraction of whole numbers; create and solve equations with one variable for multiplication and division facts. (connects to M03-S1C2-01, M03-S1C2-03)	PO 2. Create and solve equations with one variable involving multiplication and division of whole numbers. (connects to M04-S1C2-03, M04-S1C2-04)	PO 2. Create and solve equations with one variable represented by a letter or symbol given a contextual situation.	PO 3. Solve one-step equations with one variable represented by a letter or symbol, using inverse operations with whole numbers.
						PO 4. Translate a written phrase in and out of context to an algebraic expression or equation.

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Concept 4: Analysis of Change Analyze how changing the values of one quantity corresponds to change in the values of another quantity.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
				PO 1. Identify the change in a variable over time and make simple predictions.	PO 1. Describe patterns of change including constant rate and increasing or decreasing rate.	PO 1. Determine a pattern to predict missing values on a line graph or scatter plot.

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Strand 4: Geometry and Measurement

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Concept 1: Geometric Properties Analyze the attributes and properties of 2- and 3- dimensional shapes and develop mathematical arguments about their relationships.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 1. Identify circles, triangles, and rectangles (including squares) in different orientations and environments (e.g., nature, buildings, and classroom).						PO 1. Demonstrate the relationship among the diameter, radius, circumference, and definition of a circle and π.
PO 2. Build, draw, compare, describe, and sort 2-dimensional shapes (including non-standard shapes) using attributes. (connects to M00-S4C1-01.)	PO 1. Compare and sort basic 2-dimensional and non-standard shapes and describe reasoning for sorting and resorting.	PO 1. Describe and compare the attributes of 2-dimensional shapes using the terms side, vertex, point, and length for polygons up to 6 sides including their relationship to real world objects.		PO 1. Justify which objects in a collection match a given geometric description.	PO 1. Classify quadrilaterals by their properties.	
PO 3. Analyze and describe objects or figures by proximity, position, and direction. (connects to SC00-S5C2-01, SS00-S4C1-03)						

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Concept 1: Geometric Properties Analyze the attributes and properties of 2- and 3- dimensional shapes and develop mathematical arguments about their relationships.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
	PO 2. Identify and draw 2-dimensional geometric figures based on given attributes.			PO 2. Draw and describe the relationships between points, lines, line segments, rays or angles including parallelism and perpendicularity.	PO 2. Draw and label 2-dimensional figures given specific attributes including angle measure and side length.	
			PO 1. Identify and describe 3-dimensional figures including their relationship to real world objects: • sphere, cube, cone, cylinder, and rectangular prisms.	PO 3. Recognize the relationship between a 3-dimensional figure and its corresponding net(s): • make a net(s) for a basic 3-dimensional figure, • identify the 3-dimensional figure that corresponds to a given net, and • identify the net that corresponds to a given 3-dimensional figure.		

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Concept 1: Geometric Properties

Analyze the attributes and properties of 2- and 3- dimensional shapes and develop mathematical arguments about their relationships.

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
	PO 3. Describe the results of composing and decomposing 2-dimensional shapes.	PO 2. Predict and verify the results of composing and decomposing 2-dimensional shapes.	PO 2. Relate the shapes of the faces of 3-dimensional figures to 2-dimensional figures: • vertices/corners and • edges/sides.	PO 4. Recognize which attributes (such as shape or area) change or don't change when plane figures are cut up or rearranged.		
		PO 3. Describe and compare properties of simple and compound figures composed of triangles, squares, and rectangles.	PO 3. Describe patterns of geometric figures created by increasing the number of sides.			
			PO 4. Recognize similar figures.	PO 5. Match or draw congruent figures in a given collection.		
				PO 6. Draw right, acute, obtuse, and straight angles and identify these angles in other geometric figures.		PO 2. Solve problems with supplementary, complementary, and vertical angles.
				PO 7. Classify triangles by angles and sides.	PO 3. Solve problems by understanding and applying the property that the sum of the interior angles of a triangle is 180°.	

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Concept 2: Transformation of Shapes Apply spatial reasoning to create transformations and use symmetry to analyze mathematical situations.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
	PO 1. Recognize that when a figure is moved to a different place or orientation, its size and shape remain the same.					
		PO 1. Justify whether or not a 2-dimensional shape has line symmetry.	PO 1. Identify and justify all lines of symmetry, if any, in a 2-dimensional shape.			PO 1. Draw a reflection of a polygon in the coordinate plane using a horizontal or vertical line of reflection (symmetry); explain why the resulting figure is symmetrical.
			PO 2. Identify and demonstrate translations (slides), reflections (flips), and rotations (turns) using geometric figures.		PO 1. Demonstrate reflections using geometric figures (axis of reflection bisects figure).	PO 2. Recognize and identify simple single translations and reflections on a coordinate plane using all 4 quadrants.

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Concept 3: Coordinate Geometry Specify and describe spatial relationships using rectangular and other coordinate systems integrating content from each of the other strands.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
				PO 1. Name, locate, and graph points in the first quadrant of a grid using ordered pairs.		PO 1. Graph ordered pairs in any quadrant of the coordinate plane.
				PO 2. Construct geometric figures with vertices at points on a coordinate grid.		PO 2. State the missing coordinate of a given figure on the coordinate plane using geometric properties to justify the solution.
				PO 3. Plot line segments in the first quadrant in the coordinate plane from a table of values.		

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Strand 4: Geometry and Measurement

Every student should understand and use all concepts and skills from the previous grade levels. The standard is designed so that new learning builds on previously learned skills. Communication, Problem-solving, Reasoning & Proof, Connections, and Representation are the process standards that are embedded throughout the teaching and learning of all mathematical strands. Communication in mathematics includes reading, writing, listening, and speaking. (See the Arizona Language Arts Standard.)

Concept 4: Measurement Understand and apply appropriate units of measure, measurement techniques, and formulas to determine measurements.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 1. Compare and order objects according to observable and measureable attributes. (connects to SC00-S1C3-02, SC00-S5C1-02)	PO 1. Compare and order objects according to length, capacity, and weight by: • directly comparing and • measuring using non-standard units (using multiple units or using one unit multiple times). (connects to M01-S1C1-01, M01-S1C1-02)					

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Concept 4: Measurement Understand and apply appropriate units of measure, measurement techniques, and formulas to determine measurements.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 2. Use the attribute of length to describe and compare objects using non-standard units: • demonstrate the process of iteration using multiple constant units, • demonstrate the process of iteration using one unit multiple times, • estimate length to the nearest whole unit, and • use the same non-standard unit to compare the lengths of two objects. (connects to M00-S1C1-01, M00-S1C1-02, SC00-S1C2-03)	PO 2. Estimate the length of a given object and measure actual length using the benchmark of one inch. (connects to SC01-S1C2-03)	PO 1. Apply measurement skills to measure the attributes of an object (length, width, height, capacity, weight): • name measureable attributes of the object, • select an appropriate attribute to measure, • select an appropriate unit of measure (inch, foot, ounce, pound, cup, or quart) and tool, • estimate, • measure, and • compare estimate to actual measure. (connects to M02-S1C1-01, M02-S1C1-02, SC02-S1C2-03, SC02-S5C1-01)	PO 1. Apply measurement skills to measure length, weight, and capacity using metric and U.S. customary units: • select the appropriate unit of measure (yd, pint, gallon, cm, m, mL, L, g, kg), • select the appropriate tool, and • estimate, measure, and compare estimate to actual measure. (connects to SC03-S1C2-04)	PO 1. Estimate the size of an object with respect to a given measureable attribute determining when an actual or estimated measure is needed.		PO 1. Estimate the measure of objects using a scale drawing or map.

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Concept 4: Measurement Understand and apply appropriate units of measure, measurement techniques, and formulas to determine measurements.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
	PO 3. Sequence the days of the week and the months of the year.	PO 2. Tell time to the nearest minute using analog and digital clocks.	PO 2. Determine elapsed time: • across months using a calendar and • by hours and half hours using a clock.	PO 2. Compute elapsed time to the minute using a clock.	PO 1. Solve problems using elapsed time.	
			PO 3. Read temperatures on a thermometer in metric and U.S. customary units.			

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Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
					PO 2. Measure angles between 0 and 360 degrees.	
				PO 3. Select and use appropriate type of unit for the attribute being measured: metric unit to the thousandths and U.S. Customary to the eighths. (connects to SC04-S1C2-04)	PO 3. State an appropriate measure of accuracy for a contextual situation. (connects to SC05-S1C2-04)	PO 2. Determine the appropriate unit of measure for a contextual situation and the appropriate tool to measure to the needed precision (including but not limited to length, capacity, angles, time, and mass). (connects to SC06-S1C2-04)

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Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
		PO 3. Demonstrate equivalent relationships using iterations: • 1 foot = 12 inches, • 1 quart = 4 cups, • 1 pound = 16 ounces, • 1 hour = 60 minutes, • 1 day = 24 hours, • 1 week = 7 days, and • 1 year = 12 months.	PO 4. Determine equivalent relationships for units of length, weight, and capacity: • centimeters to meters, • inches or feet to yards, • ounces to pounds, • cups to pints, pints to quarts, quarts to gallons, • milliliters to liters, and • grams to kilograms.	PO 4. Solve problems involving conversions within the same measurement system.		PO 3. Convert within a single measurement system (U.S. customary and metric) (e.g., How many ounces are equivalent to 2 pounds?).
			PO 5. Determine the area of a rectangular shape using an array model.	PO 5. Solve problems involving perimeter of plane figures and area of rectangles.	PO 4. Solve area and perimeter problems involving regular and irregular polygons using reallotment of square units.	PO 4. Solve problems by determining the relationship between area and perimeter for regular and irregular polygons.

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Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
				PO 6. Describe the change in perimeter or area when one attribute (length or width) of a rectangle is changed.	PO 5. Solve problems involving the area of plane figures by using the properties of parallelograms and triangles.	PO 5. Solve problems involving the area of simple polygons using formulas for rectangles and triangles.
					PO 6. Compare attributes of 2-dimensional figures with 3-dimensional figures by drawing and constructing nets and models.	
					PO 7. Determine relationship between the volume of a figure and area of its base.	PO 6. Describe the relationship between the volume of a figure and the area of its base.

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Strand 5: Structure and Logic

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Concept 1: Algorithms and Algorithmic Thinking Use reasoning to solve mathematical problems in contextual situations.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
			PO 1. Discriminate necessary information from unnecessary information in a given word problem.	PO 1. Discriminate necessary information from unnecessary information in a given word problem.	PO 1. Discriminate necessary information from unnecessary information in a given word problem.	
				PO 2. Analyze common algorithms for computing with whole numbers using the associative property and concepts of place value.	PO 2. Analyze common algorithms for computing with decimals using the associative property and concepts of place value.	PO 1. Analyze algorithms for computing with fractions. (connects to M06-S1C2-01)
					PO 3. Develop an algorithm or formula to calculate areas of simple polygons.	PO 2. Create and justify an algorithm to determine the area of a given compound figure using parallelograms and triangles.

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Concept 2: Logic, Reasoning, Arguments, and Mathematical Proof Evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
PO 1. Develop the problem solving strategy of acting it out. (connects to M00-S1C2-01)	PO 1. Develop the problem solving strategy of drawing a picture.	PO 1. Develop the problem solving strategy of making an organized list. (connects to M02-S2C3-02)	PO 1. Develop the problem solving strategy of looking for a pattern.	PO 1. Develop the problem solving strategy of guess, check, and revise with justification.	PO 1. Develop the problem solving strategy of using logic (if . . . then and logical reasoning).	PO 1. Develop the problem solving strategy of working backwards.
	PO 2. Solve a non-routine problem by selecting and using a strategy.	PO 2. Solve a non-routine problem by select and using a strategy.	PO 2. Solve a non-routine problem by selecting and using a strategy.	PO 2. Solve a non-routine problem by selecting and using a strategy.	PO 2. Solve a non-routine problem by selecting and using a strategy.	PO 2. Solve a non-routine problem by selecting and using a strategy.
PO 2. Create word problems based on sums to 10 and differences with minuends to 10. (connects to M00-S1C2-01)	PO 3. Create word problems based on addition and subtraction facts through 20. (connects to M01-S1C2-01)	PO 3. Create written addition or subtraction word problems using one or two digit numbers. (connects to M02-S1C2-01)	PO 3. Create written word problems using addition, subtraction, multiplication, or division. (connects to M03-S1C2-01, M03-S1C2-03)			
						PO 3. Solve simple logic problems, including conditional statements, and justify solution methods and reasoning. (connects to SC06-S1C1-02, SS06-S1-07, SS06-S2-07, SS06-S4-03)

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Concept 2: Logic, Reasoning, Arguments, and Mathematical Proof Evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.						
Kindergarten	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
					PO 3. Identify simple valid arguments using *if … then* statements based on graphic organizers (e.g., 3-set Venn diagrams and pictures).	
					PO 4. Construct *if…then* statements to generalize rules for computation, geometric properties, and algebraic functions.	

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